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TECHNOLOGICAL CHANGE – ITS CROSS-BORDER IMPACT IN TERMS OF CORPORATE STRUCTURES, BRANCHES, MERGERS, AND STRATEGIC ALLIANCES

Clive V. Allen^{*}

As we approach the beginning of the new millennium, we have come to recognize in a very tangible way that the world and everything within it is rapidly changing. The changes are not prompted by the end of one year and the beginning of the next, or the end of one century and the beginning of the next, but by the tremendous evolution of technology which has really only happened within our lifetimes. The development of civilization as we know it has been evolutionary and relatively slow until recent years. Of course, there have been remarkable developments in science and medicine in previous times and certainly relative to the wisdom of the period. One only has to look at the theories of Pythagoras, the laws of gravity, the determination of the Earth's rotation around the sun, or the understanding of the human circulatory system to understand that the world has always been in a learning mode and that great people throughout the ages have discovered remarkable things.

What marks the twentieth century is the rapidity with which developments have occurred on so many fronts, not sequentially as in days of yore, but concurrently. Within the lifetime of all the people here today, two areas of particular significance have developed: semiconductors, based on the transistor developed by scientists at Bell Labs, providing for the miniaturization of so many devices; and software providing the thinking for many of these devices. I single out these developments not because, as in days gone by, they would have been the sole achievement of the period, but because of the enormous impetus that they have provided to so many other developments that have taken place, if not concurrently at least shortly thereafter. Such technological change, as we have experienced it in recent times, has a profound effect on the world around us.

I want to use this as an introduction into a reasonably personal discussion of what we at Northern Telecom, or Nortel Networks as we now call ourselves, have had to recognize as an important change in our business dictated by changing technologies.

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Nortel is a business that had its origins in the 1880s when it started to develop primitive telephone equipment as a division of Canada's first telephone operating company. Beginning with those early days, and obviously inspired by the invention of the telephone by Alexander Graham Bell, we manufactured for the Canadian market a wide range of products for telephone operating companies, from telephone sets in their simplest and most primitive form, through to the early and relatively basic switching systems that connected telephone lines. It may be difficult for us to realize today that telephones were not always able to provide the private links that we have known during our lifetime. In the early days of telephony, telephones were all manually linked by telephone operators.

In 1889, a Kansas City undertaker, Holomon Brown Strowager, found that as telephones began to be used more, his funeral parlor seemed to be losing business to a competitor. Convinced that the telephone operators were monitoring telephone conversations and providing leads to his competitor, he developed a switching system to connect the telephone automatically so as to reduce or even eliminate the role of the operator. That development clearly revolutionized voice communications and assisted in the establishment of an industry which has grown to serve 800 million subscribers throughout the world today. Nortel, I am pleased to say, has been one of the prime beneficiaries of that development, so that over the last hundred or so years we have evolved from a small and geographically limited supplier of telephone equipment into a company with sales in 150 countries, revenues approaching twenty billion dollars, and in excess of seventy-five thousand employees around the world, one quarter of them engaged in research and development activities designed to maintain the evolution of what is now not only voice communications but data communications as well.¹

But to put the subject into proper perspective, move away from the past, and look more at the present; last year Nortel made one of the most dramatic changes in its hundred-year history. For the better part of one hundred years, voice communication has been connected from one subscriber to another, from one geographical region to another, by switches which, while this century far more advanced and infinitely more capable and efficient switches than the Strowager switch, have been structured to facilitate voice communications at their optimum. But in the last few years, there has been a dramatic growth in data transmission, so much so that, while five years ago voice traffic may have represented over ninety percent of the traffic on communication lines, we have now reached a fifty-fifty split between voice and data traffic in

¹ See Nortel, *About Us, Corporate & Investor Information*, available at <<http://www.nortelnetworks.com/corporate/>> (visited July 19, 1999).

the United States, and data traffic is growing ten times faster than voice.² At this rate, data will provide nearly eighty percent of network traffic by next year. Some authorities believe that by the year 2005, seventy percent of the traffic will be data, leaving approximately thirty percent voice.³

In our 1998 annual report we note, in rather terse and legalistic language, the following:

Nortel Networks expects that data communications traffic will grow substantially in the future compared to the modest growth expected for voice traffic. The growth of data traffic is expected to have a significant impact on traditional voice networks and create market discontinuities which will drive the convergence of data and telephony and give rise to the demand for IP-optimized networks. [IP, as you know, stands for Internet protocol.] Many of Nortel Networks' traditional customers have already begun to invest in data networking.

* * *

In order to position Nortel Networks to take advantage of the anticipated growth in demand for IP-optimized network equipment, Nortel Networks has made a number of strategic acquisitions, including the acquisition of Bay Networks. Acquisitions, particularly an acquisition the size of the Bay Networks acquisition, involve significant risks and uncertainties. These risks and uncertainties include the risk that the industry does not evolve as anticipated and that the technologies acquired do not prove to be those needed to be successful in the industry, the difficulty in integrating new businesses and operations in an efficient and effective manner, the risks of customers of Nortel Networks or the acquired businesses deferring purchase decisions as they evaluate the impact of the acquisition on Nortel Networks' future product strategy, the potential loss of key employees of the acquired businesses, the risk of diverting the attention of senior management from the operation of the business, and the risks of entering new markets in which Nortel Networks has limited experience.

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² See Nortel (Northern Telecom) and Nortel DASA Demonstrate Focus on Webtone at CEBIT '98, Press Release, Mar. 18, 1998 (visited July 19, 1999) <http://releases.twoten.press.net/releases/date/1998/03/18/TECHNOLOGY-Cebit_Webtone.html> (containing remarks of Nortel President J.A. (Ian) Craig regarding the growth of data traffic versus voice traffic).

³ See Kimberly Caisse, *Nortel CEO: Wireless Data is Next Frontier*, CONSUMER RESELLER NEWS, Oct. 22, 1998 (visited July 19, 1999) <<http://planetit.com/techcenters/docs/Networking/News/PIT19981027S0012>>.

The markets for Nortel Networks' products are characterized by rapidly changing technologies, evolving industry standards, frequent new product introductions, and short product life cycles. Nortel Networks' success is expected to depend, in substantial part, on the timely and successful introduction of new products and upgrades of current products to comply with emerging industry standards and to address competing technological and product developments carried out by others. The development of new, technologically advanced products, including IP-optimized network products, is a complex and uncertain process requiring high levels of innovation, as well as the accurate anticipation of technological and market trends. The success of new or enhanced products, including IP-optimized network products, is dependent on a number of other factors including the timely introduction of such products, market acceptance of new technologies and industry standards, and the pricing and marketing of such products.⁴

There in the language of the annual report is something that indicates the impact of these technological changes on our company. One of the most important contributors to this growth in data traffic is the World Wide Web. In fact, the World Wide Web runs on the telephone system using the access infrastructure of the public telecommunications network. But the telephone network was designed and optimized for voice traffic and voice calling patterns, not for data, and certainly not for the explosive growth of long-lasting data calls initiated by increasing numbers of Web surfers.

I heard of a recent incident in which someone was complaining of the bad telephone service he was getting. He had been on the Internet for thirty-six or thirty-eight continuous hours and something went wrong at some point and he lost the connection. In the old days people did not speak on the telephone that long, with the possible exception of some of my children. Further, the routing infrastructure of the Internet is not as robust as that of the telephone network. A data packet is sent to an end point using a "best efforts" approach. If a facility is unavailable or fails, or if the traffic is congested and buffers overflow, then the traffic does not reach its destination. This approach is not designed to deliver guaranteed service.

The challenge then is straightforward. Can this service be structured so that it is appropriate for handling Internet traffic profitable to the service provider that makes a lot of money on voice calls, but does not make any money on these long lasting Internet calls unless it is on a unit message basis, which

⁴ NORTEL NETWORKS, INC., 1998 ANNUAL REPORT 26 (1999).

it is in only a few places? Can the service provider offer the same accessibility and reliability we take for granted with respect to voice networks?

Statistics indicate that there has been a growth in the number of users on the Web from less than ten million in 1995 to almost 100 million in 1998, with the expectation that, by the end of this year, the number of users will exceed 125 million.⁵ The number of companies in the United States with Web sites has also increased dramatically. At the end of 1998, fifty-five percent of the companies with less than a thousand employees, and sixty-five percent of companies with more than a thousand employees, had Web sites. This represents a significant increase even over 1997. The forecast for electronic commerce shows an escalation from the virtually nil level in 1995 to in excess of twenty-five billion dollars by the year 2001. Many commercial, financial, educational, and governmental institutions have, of course, their own private networks increasingly transmitting data.

This migration from only voice traffic to almost entirely data traffic has had a tremendous impact on the communications industry. Voice communication, particularly in North America, has enjoyed a very high level of reliability over many decades. Almost everyone has experienced issues with respect to computer reliability, and that has been reflected in the reliability of data networks as compared with traditional voice or telecommunications networks. For example, recent statistics indicate that data networks have an eighty percent reliability, whereas telecommunication networks have a 99.99% reliability. These statistics translate into average down time for data networks, and by down time I mean "not readily available," of four hours per month. The traditional standard for voice networks, going back in my own experience well over twenty-five years, has been two hours of down time over a forty-year period. While these numbers for telecommunications networks were targets rather than achievements twenty or more years ago, we have long since passed the stage where those targets have not only been met but have been significantly exceeded. We can now think of telecommunication networks as having down time measured in seconds per year.

As my colleagues at Nortel saw these developments in traffic patterns, and as we viewed new and relatively small competitors entering the market with different solutions, we sought the advice of our customers as to how they wished to be served. Our customers, who are often, but not always, large telephone companies or operators of major voice networks or cellular communication services, said they needed networks that were optimized for data

⁵ According to a recent report in *Communications Daily*, the Internet had three million users in 1995, and presently has 140 million users. See *E-Commerce Regulation Requires Balanced Views, FTC Work Group Told*, COMM. DAILY, June 10, 1999, available in 1999 WL 7579652.

transmission, but also able to deliver quality voice transmission. They also wanted a technical evolution of their existing networks to service their data transmission requirements while preserving their revenues from voice transmissions. They wanted a supplier who understood both voice and data in order to make data transmission as reliable as voice. Bear in mind that the telephone companies have billions of dollars in infrastructure, products that they would ordinarily have expected to have used for many years, and here they were being asked to address this major, almost instantaneous change.

This technological change was, for us, a very significant matter, as we have a substantial investment in the design and manufacture of the latest and best voice transmission technology, but it was technology and a product line optimized for voice rather than data. It was equally significant for our customers because they all had, relative to their size, significant investments in an infrastructure, major parts of which traditionally had a life expectancy of thirty to fifty years, and thus tended to be amortized over an extended period of time. These customers were having to consider massive investments in new technologies, not only to service with high quality their existing voice traffic, but also to service substantial volumes of new but probably far less profitable data traffic. Further, our customers were having to contend with a host of new competitors who were unencumbered by a mature network, as well as their own mentality which was not totally divorced from the ancient regulatory regime that had conferred monopoly status and guaranteed rates of return on these traditional suppliers.

In days gone by, when major technological changes could be addressed over an extended period of time, we would have usually dedicated substantial human and financial resources to develop a neat technological solution to the issues at hand. This was not possible in this situation because of the very rapid growth of the requirements for cost-effective and voluminous data transmission and the rapid rise of new, yet technically skilled and commercially astute, competitors. We concluded after a quick but thorough review of the situation that our best opportunities were to be found in making the right acquisition of a major enterprise in the sector whose products would complement ours, and vice versa, and whose corporate culture would mesh with our corporate culture, not necessarily being the same but being compatible, with each culture being capable of enriching the other culture.

After this analysis the decision was made as to how to proceed. The choice candidate was identified as Bay Networks, Inc., a Silicon Valley-headquartered supplier of switchers, routers, hubs, remote, and Internet access solutions and Internet services and network and management applications. Initiatives were undertaken beginning in March 1998, which led to a confidentiality agreement being executed in May of that year, followed by

discussions, negotiations, contract drafting, and due diligence leading to the execution of definitive agreements, approval of the boards of directors of each party, announcement of the transaction in mid-June of 1998, approval by regulatory authorities, particularly on antitrust, and the subsequent approval by the shareholders of Bay Networks to that company being acquired. The merger of the business of the two companies was consummated in the latter part of last year.

For some time I have been highlighting, within the context of my own employer and industry, how technological change can happen and necessitate a response in order not only to thrive but in fact to survive. Interestingly, when we announced the expected merger, Nortel's stock dropped over fifteen percent within twenty-four hours. The securities analysts did not understand the need for this acquisition, and wherever there is uncertainty, many people tend to flee the stock market. This was, frankly, a surprise to me because I would have expected the security analysts who follow our stock, being well-informed and intelligent professionals, to have responded positively to our strategy to meet this change in our traditional markets, so that we should have seen the stock value rise by as much as it fell. My own observation at the time was that those who were then so negative about this investment would be the people who, two years later, would have been even more negative if we had not aggressively met the needs of the market and made this move. What has happened since the acquisition bears out my earlier views.

First, our major competitor in North American markets, Lucent Technologies, felt obliged to make an acquisition of a similar company, Ascend, which was one we chose not pursue, at over twice the price we paid for Bay.⁶ Secondly, our stock has rebounded from those depressed days so that now trade is at forty percent over the price immediately following the announcement of the proposed merger, an increase substantially disproportionate to the rise in stock market prices generally in that period. Thirdly, the market has come to look enthusiastically on this decision. As one commentator noted:

The combination of Nortel and Bay marks the furthest step today towards true convergence of voice and data networking. It therefore also becomes the quickest test of whether that convergence is market reality and not a product of marketing hype. In fact, Nortel will be uniquely positioned to help its customers merge their voice and data systems at the enterprise level, building on its base of corporate tele-

⁶ See Barnaby J. Feder, *Finally, Lucent and Ascend Tie the Knot for \$20 Billion*, N.Y. TIMES, Jan. 14, 1999, at C1.

com systems and Bay's expertise in routers and local area network technology.

I would have liked to have said that myself, but I have to give them full credit. These comments were made prior to the announcement of the Ascend acquisition by Lucent, an acquisition that reinforced, I believe, the merits of our own acquisition.

Some important consequences flowed from the acquisition of this company. Because it was an acquisition paid for in stock rather than cash, it provided a quite substantial dilution of the interest of our then-parent company, Bell Canada Enterprises (BCE), Canada's largest publicly traded company. Bell Canada, BCE's corporate predecessor, held the majority interest, and for many years the sole equity interest, in Nortel until we did an IPO in 1973. Even though that controlling interest gradually declined, BCE remained, twenty-five years later, the majority shareholder of Nortel. The acquisition of Bay diluted BCE's equity position to approximately forty and one-half percent, resulting in Nortel's ceasing to be a subsidiary of BCE and precluding BCE from consolidating the results of Nortel and the financial results of BCE, and interestingly then ceasing to be Canada's largest publicly traded company, although it does probably have more shareholders than any other company. So, this represents a major change in a very long-standing and important relationship.

Absent this dramatic change in technology, necessitating an accelerated broadening of Nortel's product portfolio, the traditional relationship of parent and subsidiary would likely have continued, as would the traditional role of Nortel in developing and evolving its own products. In the past, such developments have helped to establish the standards for telecommunications activities throughout the world, but all companies having to contend with changing business environments need to respond to those changes in a positive way which recognizes the need to adapt, rather than resist changes which are inevitable. This is no different from carriage and harness manufacturers recognizing the arrival of the horseless carriage and the need to make a successful transition to the new market or disappear. We have seen this in many instances during the century, and with the pace of change as rapid as it is we will experience similar situations constantly as we enter and move through the twenty-first century.

As the Greek philosopher Heraclitus wrote twenty-five hundred years ago, "Nothing is permanent except change." I said at the beginning of my remarks that technological change has a profound effect on the world around us. The secret for success, obviously, is to sense changes about to descend on us, find the most satisfactory way of addressing those changes, and make the investment of energy, time, and money required to implement those changes.

This strategy will not necessarily guarantee success, but it will afford a much better opportunity than exists for those who choose, like the proverbial ostrich, to keep their heads in the sand. As I leave my role in Nortel, having lived through many technological changes that have occurred in our industry and around us, I feel comfortable that Nortel has responded in an appropriate manner to the forces at work, and I am confident that, as we continue to ride on this wave of technological change, Nortel will continue to have the experience, the courage, the confidence, and the know-how to meet the challenges of the future.

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